#2339

FOREST INSECT AND DISEASE CONDITIONS IN ALASKA – 1972

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE – ALASKA REGION

COVER

Both old-growth and young regenerating stands offer opportunities for insect and disease management in Alaska.

FOREST INSECT AND DISEASE CONDITIONS IN ALASKA - 1972

by

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INTRODUCTION

The U. S. Forest Service strives, under the Federal Forest Pest Control Act, to assist Federal, State, and private land managers and owners in forest insect and disease management. Through a cooperative effort, damage and loss can be reduced on all lands to levels commensurate with forest-resource values involved.

Forest insects are a class of organisms common to many of us. Diseases imply other disorders that affect the health of trees. Disorders may be caused by pathogenic organisms, physical injury, and physiological disturbances. The last includes plant effects of moisture and temperature extremes, nutrient imbalance, air pollution, and other toxicants.

The purpose of this brief report is to provide cooperators with an overview of forest insect and disease conditions in Alaska during 1972.

CONDITIONS IN BRIEF

The spruce beetle continued to be the most damaging forest insect pest in Alaska. Several new outbreaks and many continuing ones caused tree mortality of varying intensity throughout most of the mature white spruce stands on the Kenai Peninsula. Additional outbreaks of recent origin, causing widespread and extremely heavy mortality in white spruce on the west side of Cook Inlet, were detected this past summer.

Defoliation caused by the hemlock sawfly was observed at several locations in the southern portion of southeast Alaska. Among these was an outbreak in the Ward Creek drainage near Ketchikan which caused heavy defoliation and resulted in top-killing and some tree mortality. Another outbreak occurred between Thorne Arm and Princess Bay on Revillagigedo Island. Black-headed budworm larvae were collected for the second year at many sampling points on the Ketchikan and Kasaan Ranger Districts and were newly recorded at a number of locations on the northern half of the Tongass National Forest. No projects were undertaken to control either defoliator or inner bark insects in 1972.

The forest disease situation is little changed from 1971. Hemlock dwarf mistletoe and hemlock dieback continue to be the most serious disease problems in the second-growth stands of southeast Alaska. Considerable winter drying of conifers was observed in both southeast Alaska and portions of the Kenai Peninsula. Air pollution caused by sulfide emissions from the Silver Bay pulp mill near Sitka is the likely cause of tree mortality nearby.

BARK BEETLES

SPRUCE BEETLE, *Dendroctonus rufipennis* (Kby.). A newly detected outbreak, now in progress for the third or fourth year, has caused considerable mortality to white spruce stands on seven townships of State selection and Tyonek Indian Reservation lands stretching from the McArthur River Delta northeast to the Beluga River on the west side of Cook Inlet. The areas of heaviest mortality, amounting to severe stand depletion on approximately 70,000 acres, are located along the Chakachtna River Delta; in the Straight, Nikolai, and Chuitkilnacha Creek drainages near Trading Bay; and on portions of the Tyonek Indian Reservation between Congahbuna Lake and the Chuitna River.

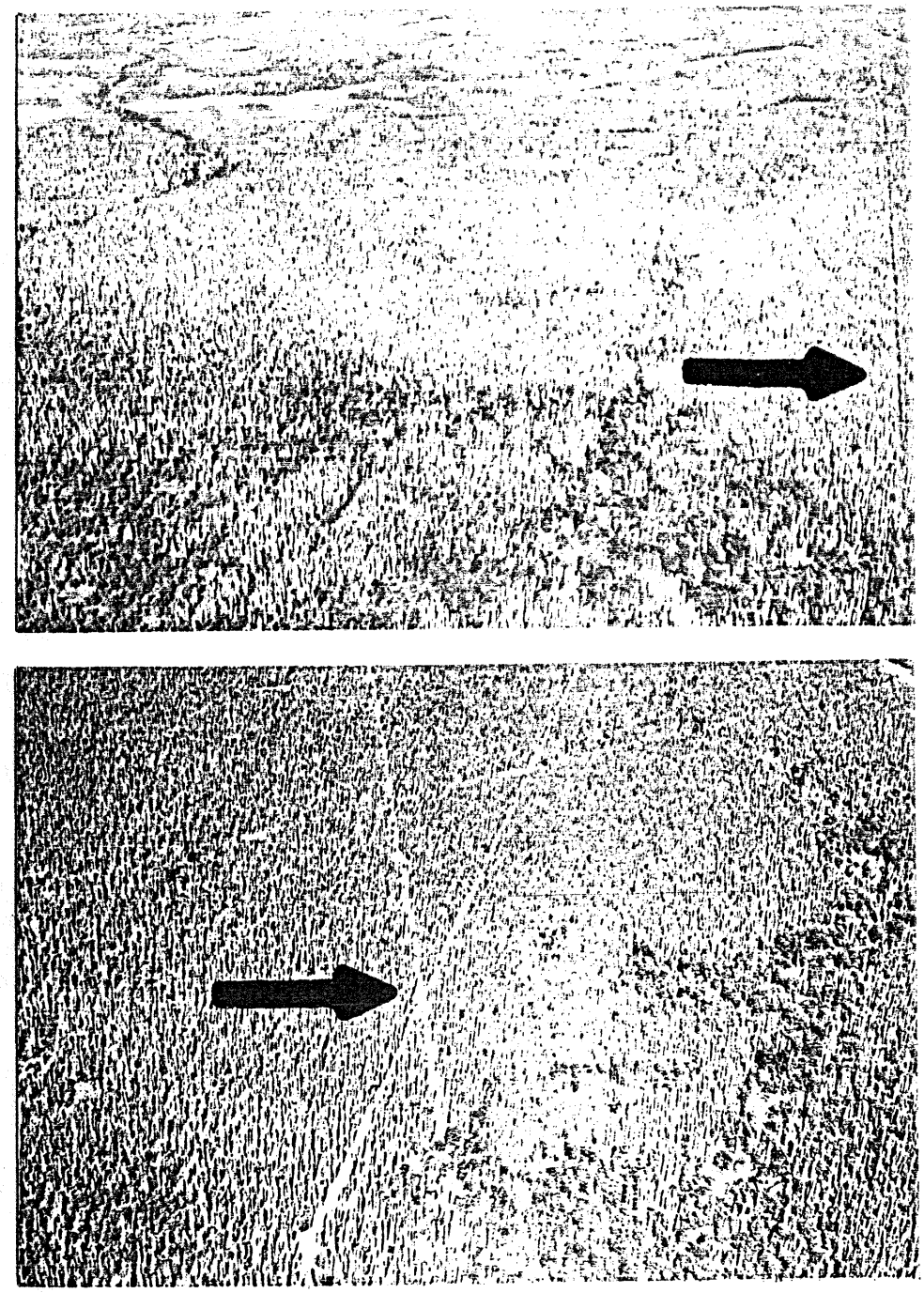
The cause of this outbreak and time when it began are not definitely known. However, it is assumed that the extensive petroleum exploration in this area from 1965-1968, preceding the severe drought years of 1968-1969 in the Cook Inlet basin, produced vast amounts of downed material suitable for brood development. Presumably, the large populations which developed in the widespread and abundant right-of-way material emerged and attacked the extensive stands of drought-stressed trees. Past records indicate that most major outbreaks are triggered by natural catastrophes or relatively large-scale, man-related disturbances coinciding with periods of prolonged moisture deficiency. The future trend of this infestation is not definitely known. However, it is expected to continue until most suitable host material has been depleted. Possibilities of extensive salvage harvest are being explored by the State.

Additional small outbreaks, amounting to approximately 5,600 to 6,000 acres, occur on Bureau of Land Management lands along the southwest shore of Cook Inlet near Mt. Iliamna. They are located in Sitka spruce stands adjacent to several areas of blowdown which occurred in 1967 and 1968. Additional mortality is expected to occur in 1973.

Estimated acreage and gross volume of mortality by ownership class resulting from spruce beetle outbreaks in the Cook Inlet basin*

Ownership class	Acres infested	Estimated gross volume (M board feet)
Kenai National Moose Range	149,800	596,300
Bureau of Land Management	5,700	35,000
Tyonek Indian Reservation	12,000	82,500
State & Private	253,700	1,001,500
Total for all ownerships	421,200	1,715,300

*Acreages determined by sketch mapping and dot grid computation on 1:250,000 scale maps.



White spruce killed by spruce beetle near Tyonek. Arrows indicate same intersection of 75-foot-wide trails of downed slash resulting from geophysical prospecting for petroleum reserves. Upper: true color aerial photo showing gray snags. Lower: infrared aerial photo showing dead trees in green with birch and cottonwood in brown.

Spruce beetle activity on the northern half of the Kenai Peninsula has decreased following six years of outbreak that has resulted in extensive mortality of mature white spruce. Infestations are still active in the Swanson Lakes area and between Barabara and Phalarope Lakes but are declining as the insect depletes available host material.

The most serious outbreak now in progress on the Kenai Peninsula occurs south and west of Lake Tustumena on State and private lands located between Clam Gulch and the Anchor River. The number of red-topped trees has increased tenfold in this area since 1970, and tree killing is now in progress over an estimated 60,000 acres.

A combination of favorable environmental factors, including an abundance of host material, large populations of overwintering beetles, and a continuation of drought portends additional tree killing and an enlargement of this outbreak in 1973.

Conditions on National Forest land on the eastern half of the Kenai Peninsula are more encouraging than in the past few years. Many areas of chronic infestation on the Chugach National Forest have become endemic. Examination of temporary study plots located within the perimeter of the 1969 Russian River Burn indicates that spruce beetle populations have collapsed following the depletion of fire-damaged host material. Beetles showed a strong preference for trees with green crowns and partially burned lower boles and root systems. Beetles were, however, unable to develop the large vigorous broods necessary to culminate in attack of green standing trees. Green, healthy trees were rarely attacked, and no attacks were observed in severely burned trees.

The infestations active in the East Fork drainage since 1967 subsided by 1972. Very little new spruce mortality was observed from the air, and few newly attacked trees were detected by ground sampling. Examination of 1969 and 1971 blowdown in the Resurrection Creek drainage indicated that light, widely scattered broods exist but pose no immediate threat to standing green trees. Emerging populations are expected to infest portions of the remaining green blowdown during 1973 and 1974.

Spruce beetle activity in southeast Alaska is occurring on State, private, and National Forest lands in the vicinity of Sitka. The mortality, confined to trees that were severely defoliated by spruce aphid populations in 1970, has resulted in a significant amount of damage to the aesthetically valuable overmature spruce in and around the Saw Mill Creek Campground located on the Sitka Ranger District. A survey of this area revealed that 40 large-diameter trees have been killed and that an additional ten have been attacked. Salvage harvest has been recommended to remove the infested material and to reduce recreational hazard.

The spruce beetle normally maintains its populations in weakened, windthrown, or otherwise downed spruce material 6 to 8 inches or greater in diameter. Recently cut or downed spruce slash, logs, or debris available as early in the year as spring snowmelt is vulnerable to spruce beetle infestation. Outbreaks commonly occur in the drier areas of southcentral and interior Alaska. Although beetle brood development can be completed in one year, it usually takes two at our latitudes. Beetle brood emerge in the early spring, usually before the woods are accessible by mechanical ground transportation other than snow vehicles. In the absence of fresh spruce slash or debris, standing trees are infested. Population buildup can then continue until sufficient host trees are depleted, biological and climatological factors contribute to population regulation, or man intercedes with suppression efforts. Suppression is most effective against localized infestations, and then, it should only be relied upon to help maintain tree stocking until some factors other than host tree depletion tip in man's favor. Direct suppression of spruce beetle outbreaks is usually an expensive last resort. Prevention of man-caused spruce beetle buildup can reduce the occurrence of infestations and can be the land manager's most desirable insect management approach. The following measures can minimize our contribution to large-scale beetle infestations in southcentral and interior Alaska.

1. In *any* land clearing of white spruce, dispose of slash, logs, and debris that is 6 to 8 inches in diameter or larger. Disposal by utilization, burning, or burying have proven effective in Alaska when conducted before the end of the winter following tree felling. It is usually acceptable to leave low stumps as they seldom provide sufficient insect breeding site to precipitate a large infestation.

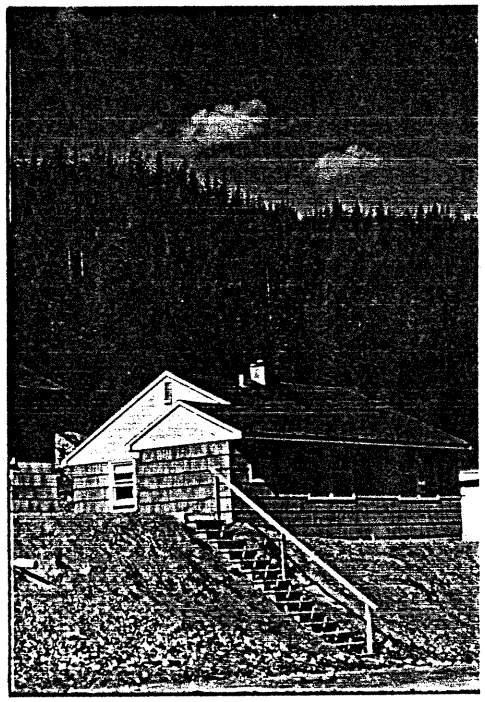
2. In laying out land-clearing of spruce for any purpose, minimize insofar as possible the exposure of vulnerable shallow-rooted residual trees or stand edges to high winds for which they have not adapted.

3. During tree removal or land-clearing in white spruce, avoid mechanical or physical damage to standing green trees as such weakening can predispose trees to beetle infestation.

Although spruce beetle outbreaks have recently been more prevalent in southcentral and interior Alaska white spruce types, they can build up in coastal Sitka spruce under suitable conditions. Between 1941 and 1946, for example, approximately 35.5 million of 122 million board feet was estimated killed by the spruce beetle on 6,400 acres of Kosciusko Island. Present beetle management in the coastal type depends upon salvage harvest in the event of beetle outbreak.

DEFOLIATORS

WESTERN BLACK-HEADED BUDWORM, *Acleris gloverana* (Wlshm.). Populations of this pest are slowly increasing throughout the Tongass National Forest. Larvae have been collected for the second year in a row at many sampling locations on Revillagigedo Island and the eastern half of Prince of Wales Island and were newly recorded at a number of locations north of Frederick Sound this season. No defoliation was observed during the aerial detection survey. However, both larval feeding and budworm eggs have been observed in many areas where sawfly populations are now active. In some cases, understory hemlock have supported defoliation.



Defoliation by the western black-headed budworm may be more noticeable in southeast Alaska during 1973.

An increase in budworm activity is expected on Revillagigedo Island near Ketchikan and at several locations on Prince of Wales Island in 1973. Black-headed budworm outbreaks have occurred in coastal Alaska at irregular intervals. The insect is native to Alaska and is a natural component of the western hemlock-Sitka spruce ecotype. In stands where some tree mortality and top-killing are acceptable, the net effects of defoliation may prove beneficial. A dense overstory can yield to pockets of desirable tree regeneration. In other instances, our demands on the coastal forest may be sufficiently intense that such tree losses and damage are intolerable. A realistic assessment by land managers and protection specialists of prevailing forest use values and expected damage from defoliation will help to distinguish areas of acceptable budworm defoliation from those that are unacceptable.

HEMLOCK SAWFLY, *Neodiprion tsugae* (Midd.). Defoliation, amounting to approximately 23,000 acres, was observed at many locations in southeast Alaska from Etolin Island south to Moira Sound on Prince of Wales Island. The majority of the newly visible feeding, amounting to nearly 14,000 acres, occurred on Revillagigedo Island and the east side of Prince of Wales Island.

The damage varies from light to moderate except in the Ward Creek drainage near Ketchikan. One season of defoliation has resulted in hemlock and spruce mortality and some top-killing within portions of a 1,200-acre outbreak occurring in patchy distribution from Ward Cove to Talbot Lake. An additional outbreak, less severe but much more widespread, occurred between Thorne Arm and Princess Bay east of Ketchikan.

Egg sample data indicate that a moderate to heavy population of sawfly and a moderate population of black-headed budworm will occur in these same areas next year. Combined sawfly and budworm feeding in 1973 is expected to result in additional tree killing in this high-use recreation area. The feasibility of a field experiment to test a promising suppression material is being investigated. Presently, no biological or chemical suppression methods are Federally registered for operational use against forest defoliators in southeast Alaska.

A general increase in sawfly populations, with additional new defoliation and some mortality in older centers, is expected to occur throughout much of the southern portion of the Tongass National Forest in 1973.

SADDLE-BACKED LOOPER, *Ectropis crepuscularia* (Schiff.). Larval survey data indicate that populations of this pest are at a very low level. Larvae were found at only one of 140 sampling locations in southeast Alaska.

GREEN-STRIPED FOREST LOOPER, *Melanolophia imitata* (Wlk.). Very low larval populations of this looper were found at 17 of 140 sampling locations this past season. However, two or more larvae were collected at only three locations in southeast Alaska.

STEM DISEASES OF CONIFERS

HEMLOCK DWARF MISTLETOE, *Arceuthobium tsugense* (Rosend.) G. N. Jones. In FY 1972 a total of 975 acres of dwarf mistletoe suppression work was conducted on the Petersburg Ranger District of the North Tongass National Forest. Treatment was conducted on only those portions of individual clearcut units supporting mistletoe-infected residual trees. The average cost of treatment is $16.41 per acre.

Direct control, consisting of felling residual hemlock in harvest units after clearcutting, is employed to minimize infection in second-growth stands. Control efforts are expected to increase as forest management becomes more intensive. There is a need to more precisely identify the effects of dwarf mistletoe on hemlock stand quality in coastal Alaska. That information will strengthen our ability to properly select units for dwarf mistletoe suppression.

HEMLOCK DIEBACK, *Sirococcus strobilinus* (Preuss.). This fungus continues to cause growth reduction, tree deformity, and limited mortality in the young stands of western hemlock at Thomas Bay near Petersburg.

The rate of infection remains at about the same level as last year. However, the disease has spread and can now be found in all of the cutting units in this area. Additional infection centers have been observed at a great many new locations in the southern portion of southeast Alaska this past year.

This disease is now apparently infecting Sitka spruce as well as western hemlock. A survey of stands at Thomas Bay indicates that a high percentage of the spruce reproduction is exhibiting disease symptoms which correspond with those of *Sirococcus*-infected spruce.

Random sampling indicates that 15-20 percent of the spruce have dead terminals or aborted terminal buds producing multiple tops. These symptoms appear in all height classes but are most commonly observed in trees 5-8 feet tall. Spruce exhibiting these particular symptoms have not yet been observed at any other locations in southeast Alaska.

GALL RUST, *Peridermium harknessii* J. P. Moore. This rust disease of lodgepole pine was commonly observed throughout southeast Alaska this past year. Limb girdling and some top-killing has occurred. However, the most common damage seems to be trunk malformation, resulting in reduced crown growth.

FOLIAGE DISEASES OF CONIFERS

NEEDLE CAST, *Lophodermium piceae* (Fckl.) v Hoehn. This needle disease was observed throughout southeast Alaska again in 1972. Reports of locally heavy infections were received from Ketchikan and Juneau.

NEEDLE RUST, *Chrysomyxa ledicola* (Pk.) Lagerh. The damage caused by this rust was highly localized and occurred at a few widely scattered locations in southeast Alaska and the Kenai Peninsula.

PHYSIOLOGIC DISEASES

WINTER DRYING. Unusual weather conditions during the late winter and early spring, accompanied by strong winds, caused winter drying of conifers in portions of southeast Alaska and the Kenai Peninsula.

Approximately 45,000 acres of damage caused by this condition was observed in Sitka spruce stands located between the Doame and Italio Rivers on the Yakutat unit of the Chatham Ranger District. The damage characterized by foliage browning was generally light to moderate except in the vicinity of the Tanis River drainage where severe desiccation resulted in heavy needle drop and extensive bud killing over approximately 2,800 acres. Favorable climatic conditions could result in some spruce beetle activity in 1973.

Severe defoliation was observed over approximately 4,300 acres on Heceta Island and several small islands in the Gulf of Esquibel. No mortality was discovered; however, the effects of the drying were evident throughout the summer.

Additional damage of a similar nature was observed on several hundred acres of mountain hemlock in the vicinity of Johnson Pass on the Kenai Peninsula. The damage in this area, superficially resembling the effects produced by herbicide application, was confined to the upper crowns of trees not covered by snow. Some top-killing and a great deal of bud damage were observed.

PLANT COMPETITION

An effort was made during aerial surveys of southeast Alaska to appraise the extent of deciduous plant competition in second-growth Sitka spruce and western hemlock. Of the cutover areas examined, a total of approximately 20,000 acres of alder, black cottonwood, or a mixture of the two was recorded. Despite alder's ability to fix nitrogen from the air and enrich the soil, its competition with commercial conifer species is usually considered undesirable. Additional study on the detrimental and beneficial silvicultural effects of this competition in coastal Alaska would be useful.